

STUDIES ON RED BLOOD CELL AGGREGATIONS USING IFEM and MD

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The aggregation of red blood cells (RBC) is of great importance in the study of blood flow in micro vessels. In this research, we investigate the physical mechanism of RBC aggregations, using the Immersed Finite Element Method (IFEM) combined with inter-cell interaction. We use IFEM model in 3D for modeling the flow of deformable RBCs immersed in plasma. The influence of hydrodynamic force on RBC aggregation is first studied by considering only the membrane-fluid interactions. Then, adhesive and repulsive forces between RBCs are included into the IFEM formulation. The aggregation of red blood cells at static state fluid is observed and compared to experimental results. The de-aggregation of RBCs cluster at different shear rates is studied. The influences of inter-cell interaction, RBC rigidity and the imposed flow condition on the blood flow are addressed separately. The results may partially explain the Fahreus-Lindqvist effect related to the viscosity of blood.

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